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ABSTRACT

A new counselee assessment/occupational exploration system provides for assessing a counselee's occupational qualifications in relation to an interest- and aptitude-oriented occupational structure and then encouraging occupational exploration in those areas which show the greatest promise of meeting the counselee's interests, values, and aptitudes. Eight components, all developed by the U.S. Employment Service, comprise the system. These are a guide for occupational exploration, a dictionary of occupational titles, a general aptitude test battery, an interest checklist, an interest inventory, two jobs selection workbooks, and other counselor- and counselee-oriented occupational planning materials currently under development. The system possesses two dimensions--an interest dimension and an aptitude dimension. Interest factors identified from a factor analysis of interest inventory items were used as the common basis for developing an occupational structure consisting of 12 interest areas. An assessment tool for measuring interest in these areas was devised. Occupational analysts then subdivided occupations allocated into the broad interest groups into work groups, based on the capabilities and adaptabilities required of the worker. This permitted the establishment of occupational aptitude pattern norms to determine a counselee's aptitude for occupations in all but seven areas. (MN)

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USES Test Research Report No. 35

A NEW COUNSELEE ASSESSMENT/OCCUPATIONAL EXPLORATION SYSTEM AND ITS INTEREST AND APTITUDE DIMENSIONS

U.S. DEPARTMENT OF LABOR

Employment and Training Administration

U.S. Employment Service

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U S DEPARTMENT OF HEALTH, EDUCATION & WELFARE
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Foreword

This report contains an overview of a new counselee assessment/occupational exploration system and its development. The system provides for assessing a counselee's occupational qualifications in relation to an interest-and aptitude-oriented occupational structure and then encouraging occupational exploration in those areas which show greatest promise of meeting the counselee's interests, values, abilities and aptitudes.

The components of the system, all developed by the U.S. Employment Service, are as follows:

- Guide for Occupational Exploration--A Bridge to the World of Work, (GOE) 2nd edition (In Press), a publication which organizes the 12,000 occupations defined in the Dictionary of Occupational Titles into 12 Interest Areas and 66 Work Groups which are homogeneous in occupational interests and aptitudes needed. In addition, the 2nd edition of the GOE relates work values, education and training, leisure and home activities, civilian and military work experience, physical demands and work settings to the GOE Work Group and Subgroup structure.

- Dictionary of Occupational Titles, 4th edition (1977), which defines all 12,000 occupations in the economy.

- General Aptitude Test Battery, developed by the U.S. Employment Service and used by State employment services and other organizations for measuring occupational aptitudes of counselees. Aptitude norms have been developed for 59 of the 66 Work Groups of the GOE. These norms are published in Section II of the Manual for the General Aptitude Test Battery (1979).

- Interest Check List (1979), consisting of 210 sample tasks which have been keyed to the Work Groups of the GOE.

- USES Interest Inventory (1981), consisting of 162 job activities, occupational titles and life experience items. The Inventory's 12 scales correspond to the 12 Interest Areas of the GOE.

- Job Selection Workbooks A and B (1979), which provide a step-by-step procedure for thinking through occupationally significant information about one's self and using it with the GOE, to explore fields of work and occupations contained in the Guide. Workbook B is a reduced and modified version of Workbook A. A revision of Workbooks A and B, based on the 2nd edition of the GOE, is being made.

- Other materials under development include a counselee-oriented Check List of Occupational Clues and a counselor-oriented Occupational Planning Worksheet, tools which will aid counselees and counselors, respectively, to organize occupationally relevant information into Work Groups and Subgroups of the GOE.

Organizations outside the employment service which would like to obtain more information about this system and possibilities of using it should contact the State or local office of their State Employment Service.

A New Counselee Assessment/Occupational Exploration System
and Its Interest and Aptitude Dimensions

Since the 1940s, the U.S. Employment Service (USES) has done extensive research to develop occupational classification structures based on human attributes related to work performance. The most important of these were the following:

1. The trait-oriented occupational structure contained in Part IV of the Dictionary of Occupational Titles, 2nd edition (U.S. Department of Labor 1944). This structure formed the basis for an applicant/occupation classification system in which entry-level occupations were grouped in terms of personal traits required, and applicants were assigned entry occupational codes in accordance with their interests, abilities, and other characteristics. However, an assessment procedure for relating an individual's characteristics to occupational requirements was never developed to accompany the structure.

2. The Worker Traits Arrangement (WTA) of occupations in Volume II of the Dictionary of Occupational Titles, 3rd edition (U.S. Department of Labor 1965). This structure covered all occupations in the DOT and was based on a comprehensive and systematic evaluation of worker trait requirements of occupations. Although this occupational arrangement contained a wealth of information on occupational requirements, it was not used widely primarily because assessment methods had not been developed linking the individual's traits to occupational trait requirements for the 114 Worker Trait Groups.

3. The Occupational Aptitude Pattern (OAP) structure (Dvorak 1947; Bemis, et al. 1973, 1974). This aptitude oriented occupational structure enabled the vocational counselor to relate an individual's General Aptitude Test Battery scores to requirements for many different occupations.

Of these three structures, only the third was specifically designed for use in a system in which individual trait assessment (aptitude testing) and the occupational classification structure (Occupational Aptitude Patterns) were both based on the same underlying factors (GATB aptitudes). The problem with this system was that it was uni-dimensional (based entirely on aptitudes), and the structure included only about 10 percent of the total number of DOT-defined occupations. A more comprehensive system was needed which would have broad occupational coverage and which would be oriented to the traits considered most important in vocational counseling. These traits, once identified as to type and then conceptualized in

terms of specific, measurable factors, could serve both as the building blocks of an all inclusive occupational structure and as the basis for individual trait measurement of counselees. Such a trait-oriented system would make it possible to relate important aptitude, interest, and other trait information about the individual to occupational groups formed to reflect occupational trait requirements.

This article describes the construction of a new occupational classification structure and the development of interest and aptitude measures for assessing counselees in relation to the two primary dimensions of the structure.

THE INTEREST DIMENSION

A decision was made that occupational interest would constitute the first dimension of the new occupational structure. A counselee's interests in job related activities are an important consideration in vocational counseling and often provide a starting point in counseling toward a vocational choice. And individuals who want to explore occupations compatible with their interests can readily understand an occupational structure whose primary dimension is based on interest factors.

The first step toward development of the interest dimension of the occupational structure was to construct an interest inventory of job activities. This inventory was designed to cover the range of occupations in the economy and to provide good representation of the interest factors identified by Cottle (1950) and used to identify interest requirements of occupations in the Dictionary of Occupational Titles, 3rd edition (U.S. Department of Labor 1965). After a preliminary analysis showed that it was not possible to develop measures of all of the Cottle factors, the 307-item inventory was factor analyzed to identify the factors that best represented responses to the job activity items (Droege and Hawk 1977). The results of this analysis indicated that (1) the responses to the inventory could be explained in terms of 11 basic interest factors, (2) these factors were readily interpretable, and (3) the factors were quite similar in meaning for males and females. The significance of this study was that it provided the basis for using, as the prime organizing principle in the new structure, a well defined and measurable variable (occupational interest) of importance in vocational counseling and career exploration.

The second step was to devise a procedure that could be applied by occupational analysts to allocate occupations to Interest Areas corresponding to the interest factors identified through the factor analysis. The procedure used involved intensive training of experienced occupational analysts, assigning sets of occupations to individual analysts for allocation to Interest Areas, and reviewing the work of the various analysts. During the allocation-review

process it became evident that one small group of occupations could not be assigned to any of the 11 Areas. Therefore, an additional Interest Area "Physical Performing" was added.

The 12 Interest Areas and their definitions are as follows:

01. ARTISTIC:
Interest in creative expression of feelings or ideas.

02. SCIENTIFIC:
Interest in discovering, collecting, and analyzing information about the natural world and in applying scientific research findings to problems in medicine, life sciences, and natural sciences.

03. PLANTS AND ANIMALS:
Interest in activities involving plants and animals, usually in an outdoor setting.

04. PROTECTIVE:
Interest in use of authority to protect people and property.

05. MECHANICAL:
Interest in applying mechanical principles to practical situations, using machines, handtools, or techniques.

06. INDUSTRIAL:
Interest in repetitive, concrete, organized activities in a factory setting.

07. BUSINESS DETAIL:
Interest in organized, clearly defined activities requiring accuracy and attention to detail, primarily in an office setting.

08. SELLING:
Interest in bringing others to a point of view through personal persuasion, using sales and promotion techniques.

09. ACCOMMODATING:
Interest in catering to the wishes of others, usually on a one-to-one basis.

10. HUMANITARIAN:
Interest in helping others with their mental, spiritual, social, physical, or vocational needs.

11. LEADING-INFLUENCING:
Interest in leading others through activities involving high-level verbal or numerical abilities.

12. PHYSICAL PERFORMING:
Interest in physical activities performed before an audience.

The third step in the development of the interest dimension was to refine the interest inventory used in the factor analysis so that it would be an adequate measure of interest in the 12 Interest Areas. This project involved construction of additional items for inclusion in four experimental inventories each of which was then administered to a sample of approximately 800 individuals. Item analysis done separately for males and females, blacks and Hispanics resulted in a set of 425 items which was administered to 6,530 individuals for purposes of additional item analysis and standardization of scores on the final 12 scales (U.S. Department of Labor, in press).

To summarize, interest factors identified from a factor analysis of interest inventory items were used to serve as the common basis for developing an occupational structure consisting of 12 Interest Areas and an assessment tool for measuring interest in these Areas.

An interesting and important characteristic of the 12 Interest Areas and corresponding Interest Inventory scales is that they are closely related to the six Holland Themes (Droege and Padgett 1979; Jones 1980). This means that many counselors who apply instruments and concepts oriented to Holland's work (Holland 1973) will find the new structure useful in their counseling. Others will prefer to take advantage of the greater differentiation provided by the 12 Interest Areas by using an instrument closely oriented to the interest factors underlying these Areas.

THE APTITUDE DIMENSION

In general, the Interest Areas are quite diverse in the educational development and aptitude requirements of the occupations assigned to the Areas. For example, occupations in the Mechanical Area range from unskilled occupations in elemental work to professional occupations in engineering, indicating great heterogeneity in educational or aptitudinal levels required. The types of aptitudes needed for successful performance also varies considerably within Interest Areas. Thus, further grouping of occupations within Interest Areas was necessary to achieve homogeneity in education, training, and aptitude requirements.

The occupational analysts who allocated occupations to the broad Interest Areas were also given assignments to subdivide these Areas into Work Groups. The criteria for forming Work Groups were the capabilities and adaptabilities required of the worker. A total of 66 separate Work Groups were formed, ranging from two groups in Area 12 to 12 groups in Area 05. (Most of the Work Groups contained a large number of occupations, making it desirable to divide the occupations into meaningful subgroups. The number of subgroups per group ranged from one in Group 01.08 Modeling to 40 in 06.04 Elemental work: Industrial. The total number of subgroups formed was 348.)

To what extent do the 66 Work Groups, formed by occupational analysts, cluster together occupations which require similar aptitudes and aptitude levels as demonstrated by criterion-related validation studies? An answer to this question required an analysis of the more than 450 Specific Aptitude Test Batteries (SATBs) produced by the continuing Federal-State cooperative test research program (Fantaci, et al. 1977) between 1950 and 1978. These SATBs, each consisting of a combination up to four of the nine GATB aptitudes with demonstrated validity for predicting success in a specific occupation, were analyzed to determine whether the Work Groups could be considered homogeneous with respect to aptitudes required for performing the duties of occupations within these groups. The results showed that the within Work Group variation in aptitude requirements was not substantial, encouraging further analysis to develop an Occupational Aptitude Pattern structure oriented to the Work Groups.

The final OAP structure developed from this research consists of 66 OAPs covering occupations in 59 Work Groups. These OAPs, which cover 97 percent of the nonsupervisory occupations in the Dictionary of Occupational Titles, 4th edition (U.S. Department of Labor 1977), are contained in Section II of the Manual for the General Aptitude Test Battery (U.S. Department of Labor 1979c.). Details of the research to develop the new OAPs are reported in Section IIA of the Manual for the General Aptitude Test Battery (U.S. Department of Labor 1980).

To summarize, most of the Work Groups formed by occupational analysts were found to be homogeneous in GATB aptitude requirements, permitting the establishment of Occupational Aptitude Pattern norms which would be used in determining a counselee's aptitude for occupations in all but seven of the Work Groups.

THE SYSTEM IN OPERATION

The keystone of this new counselee assessment/occupational exploration system is the Guide for Occupational Exploration (U.S. Department of Labor in press). The Guide contains the interest and aptitude oriented occupational structure of 12 Interest Areas and 66 Work Groups. Descriptive information is provided for each Work Group to assist the individual user to review, understand, and evaluate his or her interests and potentials and to relate them to pertinent occupations for further exploration.

The USES Interest Inventory and Interest Check List provide assessment links to the Guide based on occupational interests of counselees. The Interest Inventory is used to obtain a profile of scores on 12 scales measuring the same factors as those used to develop the Guide's Interest Areas. Identification of the two or three highest scores for a counselee provides a basis for focusing occupational exploration on those Interest Areas compatible with the counselee's primary occupational interests. For counselors who prefer using a nonscored interviewing aid when discussing interests with the counselee, the

USES Interest Check List (U.S. Department of Labor 1979b) provides a way of relating the interests of counselees in specific job activities to Work Groups within the Interest Areas which contain occupations for further exploration by the counselee. The General Aptitude Test Battery is the second major assessment link to the Guide's occupational structure. The new Occupational Aptitude Patterns were developed specifically to relate aptitude requirements for occupational success to Work Groups of the Guide. Administration of the GATB in a 2 1/2 hour session makes it possible to determine a counselee's aptitude levels in comparison with requirements for 59 of the 66 Work Groups, covering 97 percent of nonsupervisory occupations in the U.S. economy.

Other occupationally relevant attributes (values, work experience, leisure and home activities, education and training) will be included in a soon-to-be published 2nd edition of the Guide for Occupational Exploration and assessment links to these variables are being developed. The system will then be complete. The counselor will be able, through use of assessment tools developed for this purpose, to assess the occupationally important interests, aptitudes, values and other attributes of counselees in relation to relevant occupational groupings.

Many youths and other jobseekers are not prepared for effective job search because they lack knowledge about the kinds of jobs to look for. They have difficulty in relating their interests, skills and potentials to appropriate occupations. The new counselee assessment/occupational exploration system based on the Guide for Occupational Exploration and related assessment tools can be of help in counseling such individuals. Obviously, the usefulness of this new system stems primarily from its foundation in measurable human traits or attributes. The availability of a combination of aptitude and interest measures directly related to the 66 Work Groups and 12 Interest Areas of the Guide for Occupational Exploration makes this a very attractive system to vocational counselors who have access to the GATB and Interest Inventory. But another characteristic of the Guide's occupational structure that is of practical importance is that the interest-oriented Areas of Work and aptitude-oriented Work Groups are homogeneous not only in occuptional trait requirements but also in the nature of the job duties involved. This fact is apparent from a review of Work Group titles and descriptions, e.g.:

> Work Group 01.01 Literary Arts. Workers in this group write, edit, or direct the publication of prose or poetry.
>
> Work Group 03.03 Animal Training and Service. Workers in this group take care of animals of many kinds, and train them for a variety of purposes.

Work Group 05.04 Air and Water Vehicle Operation. Workers in this group pilot airplanes or ships, or supervise others who do.

Work Group 05.10 Crafts. Workers in this group use hands and handtools skillfully to fabricate, process, install, and/or repair materials, products, or structural parts.

From a practical standpoint, the clearly defined types of work performed in the Interest Areas and Work Groups make them generally meaningful to the layperson. This important feature of the structure has made it possible to organize and present material in the Guide for Occupational Exploration to facilitate its use in occupational exploration by youth and others who may have limited or no access to counseling help.

The development of an occupational structure which can be described as both human-attribute related and nature-of-work related is of some theoretical as well as practical importance. The Guide for Occupational Exploration, which contains such a structure, provides at least an approximation to the goal of devising "a unified taxonomy of work performance, that is, one that addresses the relevant characteristics of people and jobs" discussed in a recent and exhaustive review of job family development (Pearlman 1980, p.3).

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